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an upper molar of *E. imperator* has 17 cross ridges and one of *E. columbi* 21 or 22, while the number of ridges in the lower molars are respectively 18 and 22, this last being an estimate owing to the lack of a perfect specimen for comparison. In each case the molars of *E. columbi* are smaller. Thus Leidy's species may be considered as definitely established.

The mastodons are, as species go, in a badly mixed condition, and even the status of the abundant and widely distributed *Mastodon americanus* is by no means so well defined as one could wish. The last molar of this species varies enormously not only in size, but in proportions and character of the enamel, and while the typical last molar has four cross crests and a heel, there may be four cross crests only, or five cross crests and a heel. Moreover, while the enamel is usually quite smooth, it is often more or less rugose, in some instances being decidedly wrinkled, and *M. rugosidens* of Leidy is undoubtedly based upon a tooth of this character. A fine series of teeth obtained by Mr. W. H. Holmes at Afton, Ind. Terr., shows the great range of variation in the teeth of *M. americanus*.

M. shepardi, once called *obscurus*, from California, is a good species, characterized by a small narrow last molar and by the partial interruption of the valleys on one side. The true *Mastodon obscurus* is a species founded by Leidy on an imperfect last molar from North Carolina, described and figured on plate XXVII., figure 16, of the Extinct Mammalian Fauna of Dakota and Nebraska. This species is so far definitely known from our eastern coast from Florida to Maryland, and the specimens described as *M. floridanus* must be known as *M. obscurus*. The writer pleads guilty to having overlooked this when editing Dr. Leidy's posthumous paper on fossil vertebrates from the Alachua Clays. It is probable that *M. serridens* of Cope is a slightly aberrant fifth molar of *M. obscurus*, although it was decided otherwise in the memoir just referred to. Dr. Leidy was perhaps over-cautious in making new species, and described no less than three mastodons under the name of *obscurus*. As an offset to this it may be

said that there is reason to believe that Professor Cope went to the opposite extreme of describing one species under three names.

Mastodon mirificus, with a last molar having six much-wrinkled cross crests, is another well-defined species, but there are several others that are not at present well defined. Among these is *M. proavus* of Cope, which he doubtfully separated from *M. angustidens*, and may prove to be the same as *M. obscurus* (= *floridanus*) of Leidy. The writer has never seen a tooth of mastodon from an American locality that was not readily distinguishable from the European *M. angustidens*, and he ventures to doubt the occurrence of this species in North America.

M. productus Cope is another dubious species and so is *M. tropicus*, whose teeth as figured by Cope are indistinguishable from those of *M. obscurus*, while the figure of *M. proavus* strongly suggests the true *M. shepardi*. That one tooth has one more cross crest than the other and is more pointed at the heel means little, as just such differences are known to exist in the last molars of *M. americanus*, while the last molars of various mastodons appear to be exceedingly variable.

The identification of the species of mastodons from scattered teeth is, if not impossible, at least extremely difficult, while the attempt to identify species from figures is equally unsatisfactory. Another question on which light is needed is whether the presence of lower tusks and a long symphysis to the lower jaw is a specific or sexual character, or whether it may not be specific in some cases and merely indicative of sex in others? There are certainly specimens of mastodon jaws with and without tusks whose molars are indistinguishable. It is to be hoped that the time is not far distant when we may have sufficient good material to place our species of mastodons on a satisfactory basis.

F. A. L.

CURRENT NOTES ON METEOROLOGY.

THE DUST STORM OF MARCH 9-12, 1901.

THE remarkable fall of dust which occurred over Europe about a year ago has been noted in numerous short articles in various scien-

tific journals, but there has until very recently been no extended report upon it. Hellmann and Meinardus, of the Prussian Meteorological Institute in Berlin, have just issued an elaborate monograph on this subject, with the title 'Der Grosse Staubfall vom 9 bis 12 März, 1901, in Nordafrika, süd und Mitteleuropa (*Abhandl. K. Preuss. Met. Inst.*, II., 1). The region over which the dust fell extended from the desert of southern Algeria north to southern Denmark, *i. e.*, over a distance of more than 25° of latitude. There were dust storms in southern Algeria on March 8-10; and as the dust was carried northward it fell in Italy and Sicily on March 10; over the eastern Alps on the night of March 10-11; in central Germany on the forenoon of the 11th; in north-western Germany on the afternoon and evening of the 11th and in southern Denmark on the night of the 11th-12th. In Algeria and Tunis the fall was of dust; in Italy there was a fall of dust during a dry stormy sirocco, and rain heavily charged with dust also fell. In Austria-Hungary and farther north the phenomenon was everywhere associated with some form of precipitation (rain, snow, frozen rain, etc.). The amount of dust which fell to the ground decreased from south to north. Microscopical examinations of the deposit collected in various places make it plain that the dust was of terrestrial origin—an æolian deposit resulting from the disintegration of rocks in a desert region. The particles became finer and finer with increasing distance from their source in southern Algeria, and there was noted a decrease in the percentage of quartz from south to north. The northward progression of the dust-fall was associated with the advance of a barometric depression from Tunis in a north-northeast direction to the southern shore of the Baltic Sea, as shown on the daily weather maps, and the pressures at an altitude of 2,500 m. above sea level likewise indicate the presence of a southerly current from Tunis to central Germany. The velocity of this upper current was found to be 70 km. an hour, and the dust-fall itself also progressed northward at the same rate.

The report of Hellmann and Meinardus is illustrated by means of several charts show-

ing the pressures at sea level and at 2,500 m.; the distribution of the dust over Europe; the distribution of precipitation on March 12, at 7 A.M., and the distribution of temperature on March 11 and 12. 'Der Grosse Staubfall' will prove of special interest to geologists and to geographers, as well as to the meteorologists for whom it was primarily written.

METEOROLOGICAL CHART OF THE GREAT LAKES.

THE 'Meteorological Chart of the Great Lakes, Summary for the Season of 1901,' by A. J. Henry and N. B. Conger (U. S. Weather Bureau), presents a number of interesting facts concerning the meteorology of these important bodies of water. The navigation season of 1901 brought a record of 37 total losses of vessels from weather conditions, and 11 from other causes. In addition, 140 vessels were more or less damaged by weather conditions, and of these, 34 cases were due directly to fog. The total number of lives lost through stormy weather was 90. Monthly and annual normal fog charts are published with the present bulletin, embodying the results of four years of fog observations. More fog is encountered on Lake Superior than elsewhere, and the conditions of fog formation are better understood there. On Lake Michigan some of the fogs form in the summer a short distance out from shore during early morning, and dissolve under the increasing warmth of the sun's rays. The early morning land and lake breezes often cause banks of fog to form, sometimes as low-lying fog, and at other times as dense banks, with frequent openings of clear weather. In autumn, when cyclones move in from the southwest, a blanket of fog appears, and may last one, two or three days, with only an occasional clearing.

THE SEISMOGRAPH AS A SENSITIVE BAROMETER.

IN a recent number of the *Quarterly Journal of the Royal Meteorological Society* (Vol. XXVII., 1901, 293-298) there is a paper on 'The Seismograph as a Sensitive Barometer,' by Mr. F. Napier Denison, of Victoria, B. C.

A Milne seismograph was installed in 1898 at the Meteorological Office, Victoria, and the

author has since that time compared its movements with the changes of atmospheric pressure recorded by his aerograph. He finds that when the barometric pressure is high over the Pacific slope from British Columbia southward to California, while off the Pacific coast the barometer is comparatively low, the horizontal pendulum of the seismograph tends to move towards the eastward. When an extensive storm area is approaching from the westward, and often eighteen to twenty-four hours before the local barometer begins to fall, the pendulum of the seismograph swings steadily to the eastward, and in the event of a well-marked high area following, the pendulum will begin to swing towards the westward before it is possible to ascertain this area's position on the current weather charts.

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SCIENTIFIC NOTES AND NEWS.

THE National Academy of Sciences will hold its annual stated session at Washington, beginning on April 15.

PROFESSOR F. B. CROCKER has been elected chairman of the executive committee to arrange for the reception in honor of Lord Kelvin, which will be given at Columbia University on the evening of April 21.

THE University of Wales will confer its doctorate of science on Lord Kelvin, Lord Lister and Mr. Alfred Russel Wallace.

M. YERMOLOFF has been elected a correspondent of the Paris Academy of Sciences in the section of agriculture, in the room of the late Sir John Bennet Lawes. M. Baillaud has been elected correspondent in the section of astronomy.

DR. EWALD HERING, professor of physiology in the Medical School at Leipzig, has been elected a corresponding member of the Munich Academy of Sciences.

AT the annual general meeting of the Geological Society of London, on February 21, the president, Mr. J. J. H. Teall, F.R.S., presented the balance of the proceeds of the Lyell

Geological Fund to Dr. Wheelton Hind, F.R.C.S., of Stoke-on-Trent, stating that the council of the Society had made the award as a mark of their appreciation of his enthusiastic labors among the carboniferous rocks of this country.

DR. THEODORE PAUL, professor of chemistry in the University at Tübingen, has been called to the directorship of the Imperial Board of Health at Berlin.

M. SAVORGNAU DE BRAZZA, the Italian explorer in the service of the French Government, has been granted a pension of 10,000 francs.

DR. S. WEIR MITCHELL, who has for over thirty years been associated with the Philadelphia Orthopedic Hospital and Infirmary for Nervous Diseases, has resigned as senior physician, but remains as one of the consultants. Dr. John K. Mitchell has been elected to the vacancy caused by his father's withdrawal.

It is said that the Hon. Andrew D. White will retire from the ambassadorship to Germany in November.

A COMMITTEE has been formed, under the presidency of Professor von Zittel, for the erection in Munich of a memorial of the late Professor Max von Pettenkofer.

PROFESSOR ALBERT RIPLEY LEEDS, since 1871 professor of chemistry in the Stevens Institute of Technology, died on March 14 at the age of fifty-eight years.

DR. JOHANNES CHRISTOPH KLINGE, head botanist of the Botanical Gardens at St. Petersburg, has died at the age of fifty-one years.

THE death is announced from St. Petersburg of Major-General Pewzoff, known for his explorations in Central Asia, Mongolia and Tibet.

AT a meeting of chemistry teachers held at the Hotel Albert, N. Y., March 20, the Chemistry Teachers' Club was organized. A constitution was adopted, and the following officers were elected: A. C. Hale, *President*; R. H. Fuller, *Vice-President*; A. L. Arey, *Treasurer*; M. D. Sohon (Peter Cooper High School), *Secretary*.